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The advertisement call of the Cape Melville Treefrog *Litoria andiirrmalin* (Anura: Hylidae)

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The Cape Melville Treefrog, *Litoria andiirrmalin* McDonald 1997, is a hylid frog restricted to granite boulder fields and associated rainforest of the Melville Range on Cape Melville, north-eastern Australia. The species has remained poorly known because the Melville Range is rugged and remote, with limited accessibility during the summer wet season when frog activity is generally greatest. *Litoria andiirrmalin* is a large frog that inhabits boulder-pile habitat in the vicinity of streams. The original description had little information on breeding biology. The tadpole was not known at that time but has been described recently (Meyer *et al.* 2013). The call was not recorded but was described as "a rapid, gentle toc toc toc toc toc" (McDonald 1997).

On a recent trip to the uplands of the Melville Range I recorded the advertisement call of *L. andiirrmalin* and I describe the call here. The recordings were made at about 460 m elevation along a small, flowing stream under a rainforest canopy. *Litoria andiirrmalin* was abundant along a section of the stream where it flowed through deeply piled boulders, with more than 40 adults detected along approximately 50 m of stream. Before dark, frogs could be seen amongst the boulders. On dusk the frogs emerged, and the males stayed on the stream (on or immediately above the stream boulders), whereas the females generally left the stream to forage low-down (typically about 50 cm above the ground) in the nearby forest (up to about 40 m away from the stream) or well above the stream in trees. A cluster of about 10 males was positioned along a short (approx. 10 m) section of the stream where the water flowed over a small cascade and then down the face of rocks. Some of these males were calling intermittently, with each call being a long, soft, tapping call 'toc-toc-toc-toc…'. Calling males uttered a call approximately every 5 minutes. Males of *L. andiirrmalin* lack a vocal sac and the calls were barely audible above the sound of the flowing water.

I recorded two calls of a single male. Several other males were also calling but no other recordings were obtained over several hours because the call was soft against the background stream noise and the males stopped calling whenever I was close to them. The two calls were recorded at about 21:30 hours on the 13 December 2013, at an air temperature of 25°C. Recordings were made with an Edirol R09 recorder and a Sennheiser (K6 ME-66) directional microphone. A recording has been submitted to AmphibiaWeb. The calls were very similar and trait measurements are averaged for the two calls. The software Raven Pro Version 1.3 was used to measure call traits. The following call traits were measured: call duration, the length of a single call from the beginning of the first note to the end of the last note; number of notes; note rate, number of notes divided by call duration; dominant frequency, the frequency at which the call is of greatest intensity. The calls show two frequency peaks (Fig. 1), and both were measured. The higher-frequency peak is of greater intensity and is thus the dominant frequency; it is a harmonic of the lower-frequency peak, which is the fundamental frequency.

The two calls have the following mean measurements: call duration 35.75 s; notes per call 108; note rate 3.02 notes/s; dominant frequency 1210 Hz; fundamental frequency 600 Hz. The call of *L. andiirrmalin* could not be confused with that of any other Australian frog. In being a soft tapping call, it is most similar to the call of *Litoria serrata* (Andersson, 1916) or a greatly slowed down version of the soft growling call uttered by members of the *Litoria lesueurii* complex. Preliminary genetic analyses of relationships among Australian hylid frogs place *L. andiirrmalin* as a deeply divergent sister lineage to the *L. lesueurii* complex (Rosauer *et al.* 2009). The call of *L. andiirrmalin* is of considerably higher dominant frequency than expected given the large male size (mean 65 mm SVL) and the general call frequency–body size relationship seen in Australian hylids, particularly given that stream-breeding Australian hylids generally have lower-frequency calls (Hoskin *et al.* 2009). The fundamental frequency in the *L. andiirrmalin* call is more in line with the expected relationship. A larger sample size of calls is required to confirm that the higher-frequency peak is indeed the dominant frequency.

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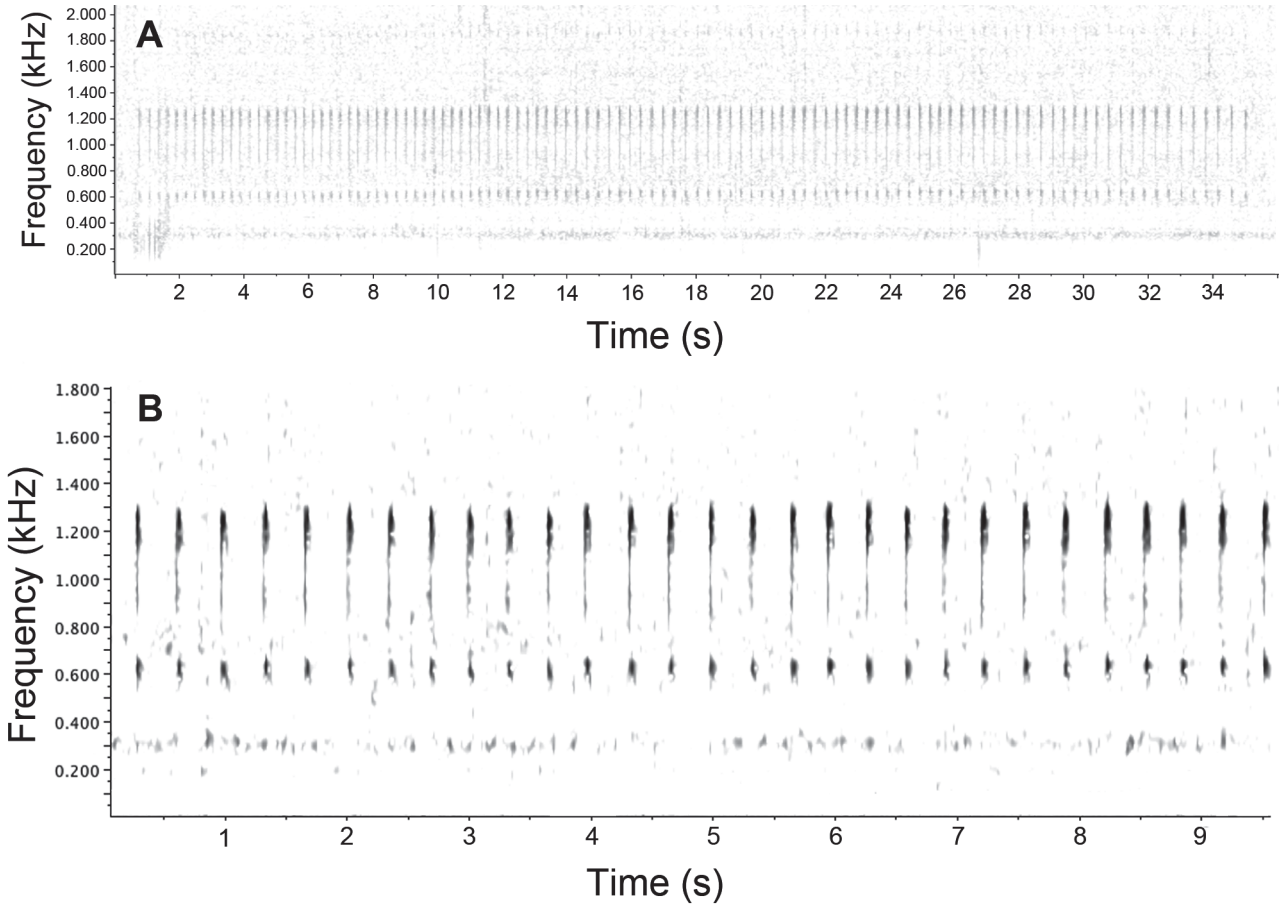

FIGURE 1. (A) A full *L. andiirrmalin* call. (B) An enlargement of an approximately 9-second section of the call. The spectrograms display call frequency (*y*-axis) and intensity (degree of shading) against time (*x*-axis, seconds). The thin line of shading evident at about 300 Hz may be a component of stream noise. A waveform could not be displayed due to low signal-to-background noise ratio.

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